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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,303	05/16/2006	**Guofu Zhou**	NL 031343	3045

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
KETEMA, BENYAM	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/579,303	ZHOU ET AL.	
	Examiner	Art Unit	
	BENYAM KETEMA	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-23 are presented for examination.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. EPO 03104295.5, filed on 11/21/2003.

Claim Objections

3. Claim 4 objected to because of the following informalities: **"A display device according to"** is incomplete. Claim 4 appears to be dependent on claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3 and 12-23 are rejected under 35 U.S.C. 102 (e) as being anticipated by Zehner et al. (U.S. PG Pub No. 2003/0137521A1).

As in **Claims** 1, 21, 22 and 23, Zehner et. al. Discloses *a device, method, apparatus and drive waveform*

- *An electrophoretic display device* (Paragraph 2, line 3-6) comprising ;
- *an electrophoretic material comprising charged particles (8, 9) in a fluid (10)* (Paragraph 2, line 6-14),
- *a plurality of picture elements* (Paragraph 89, line 8-24) discloses pixels arranged in row and columns hence showing plurality of pixels (i.e. picture elements).
- *first and second electrodes (5, 6) associated with each picture element, the charged particles (8, 9) being able to occupy a position being one of a plurality of positions between said electrodes* (Paragraph 2, line 6-14),
- *said positions corresponding to respective optical states* (Paragraph 161, line 6-9).
- *of said display device, and drive means arranged to supply a drive waveform to said electrodes (5, 6), said drive waveform comprising* (Paragraph 90, line 1-11):
- a) *a sequence of drive signals, each effecting an image transition by causing said particles (8, 9) to occupy a predetermined optical state*

corresponding to image information to be displayed, (Paragraph 163, line 1-10)

- *b) at least one voltage pulse preceding each drive signal* (Paragraph 161, line 9-15) discloses that one voltage pulse (erasing pulse) is applied before pixels are transitioned from one optical state to another.
- *wherein the polarity and energy*(Paragraph 8, line 1-3, "impulse") *represented by each said voltage pulse is dependent on, and determined by a current optical state, and wherein each voltage pulse causes said particles (8, 9) to be moved in a direction away from the electrode (5, 6) nearest thereto.* (Paragraph 78, line 1-9) discloses a voltage pulse is applied in order to move said particles is dependent on current optical state (i.e. black to white or white to black) hence away from nearest electrode.

As in **Claim** 2, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, wherein the drive waveform further includes a reset pulse, prior to one of the drive signals.* (Paragraph 150, line 1-3 and Fig 8-10). Fig 8-10 shows a reset pulse(304) being applied before the drive waveform (306 write period) in order to display new image.

As in **Claim** 3, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 2, wherein a reset pulse, prior to a drive signal, comprises an additional reset duration.* (Paragraph 150, line 1-3 and Fig 8-10) Fig 8-10 shows a reset pulse(304)

being applied before the drive waveform (306 write period) in order to display new image.

As in **Claim** 12, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, wherein image transitions include pixels without substantial optical state change.* (Paragraph 160, line 1-14) discloses current optical state and subsequent optical state are same, because the “erasing pulse” and the “blanking pulses” are applied without regard to the current and next optical states.

As in **Claim** 13, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, comprising two substrates, at least one of which is substantially transparent, whereby the charged particles (8, 9) are present between the two substrates.* (Paragraph 11, line 1-5 and Paragraph 12, line 1-11)

As in **Claim** 14, Zehner et al. discloses *a display* (Fig 1 item 26) *device according to claim 1, wherein the charged particles (8, 9) and the fluid (10) are encapsulated.* (Paragraph 11, line 1-5 and Paragraph 12, line 1-11)

As in **Claim** 15, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, wherein the charged particles (8, 9) and the fluid (10) are encapsulated in a plurality of individual microcapsules (7), each defining a respective picture element.*

(Paragraph 11, line 1-5 and Paragraph 12, line 1-11)

As in **Claim** 16, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, having at least three optical states*. (Paragraph 167, line 1-5) discloses at least three optical states black, dark gray, light gray and white.

As in **Claim** 17, Zehner et al. discloses *display device* (Fig 1 item 26) *according to claim 1, wherein the drive waveform is pulse width modulated*. (Paragraph 71, line 16-20)

As in **Claim** 18, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, wherein the drive waveform is voltage modulated.* (Paragraph 71, line 2-11)

As in **Claim** 19, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to any one of claim 1, wherein at least one individual drive waveform is substantially dc-balanced*. (Paragraph 196, line 1-13)

As in **Claim** 20, Zehner et al. discloses *a display device* (Fig 1 item 26) *according to claim 1, wherein at least some of the sub-sets of closed loops wherein an image transition cycle causes a pixel to have substantially the same optical state at the end of said cycle as at the beginning, are substantially dc-balanced*. (Paragraph 196, line 1-13) discloses when sequence of transitions beginning and ending in one optical state of pixel should be DC balanced.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zehner et al. (U.S. PG Pub No. 2003/0137521A1) in view of Machida et al. (PG Pub 2002/0196207)

As in **Claim** 4, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose the drive waveform further includes one or more shaking pulses. However, Machida et al. (See Fig 9 item initializing pulse) discloses a series of shaking pulses (initializing drive) are being applied in drive waveform. Zehnrer et al. and Machida et al. are analogous art because they are from the common area of electrophoretic display and represent known display alternatives. It would have been

obvious to one of ordinary skill in the art at the time of the invention to combine the references (Zehnrer et al. and Machida et al.), because Machida et al. suggests the application of shaking pulses effectively releases or loosen the particles from their current position so that they can be addressed by driving a pulse to the appropriate optical state to enhance the display quality. It also provides method for addressing a bistable display element having first and second display states differing in at least one optical property. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Zehner et al. by applying the shaking pulses as disclosed by Machida et al. because Machida et al. suggests the application of shaking pulses effectively releases or loosen the particles from their current position so that they can be addressed by driving a pulse to the appropriate optical state to enhance the display quality, as found in claim 4.

As in **Claim** 5, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose *the drive waveform includes one or more shaking pulses prior to said voltage pulse.* Machida et al. (See Fig 9 item initializing pulse) discloses a series of shaking pulses (initializing drive), this shaking pulses (initializing drive) are being applied before and after driving (voltage) pulses. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Zehner et al. by applying a series shaking pulses before and after driving (voltage) pulses as disclosed by Machida et al. because Machida et al. suggests the application of shaking pulses effectively releases or loosen the particles from their

current position so that they can be addressed by driving a pulse to the appropriate optical state to enhance the display quality as found in claim 5. The same reason used to combine Zehnrer and Machida in claim 4 is applicable to claim 5.

As in **Claim** 6, Machida et al. discloses *display device* (Fig 1 item 10) *according to claim 4, wherein the drive waveform includes one or more shaking pulses between said voltage pulse and a subsequent drive signal.* Machida et al. (See Fig 9 item initializing pulse and paragraph 54) discloses superimposing a DC reset pulse over the initialization drive pulse. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the display device of Zehner et al. by applying a series shaking pulses before and after said voltage pulse and a drive signal as disclosed by Machida et al. because Machida et al. suggests superimposing a short DC reset pulse in the middle of a long initialization drive pulse such that a second shaking pulse occurs during a second shaking period between the end of the reset pulse and the beginning of the drive pulse.

As in Claim 7, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose *an even number of shaking pulses are provided in the drive waveform*. However, Machida et al. (See Fig 9 and Paragraph 106 lines 12-15) discloses an even number of shaking pulses (initializing drive pulse) are being applied to the display. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Zehner et al. by applying the

shaking pulses as disclosed by Machida et al. because Machida et al. suggests the application of shaking pulses effectively releases or loosen the particles from their current position so that they can be addressed by driving a pulse to the appropriate optical state to enhance the display quality, as found in claim 6. The same reason is used to combine Zehnrer and Machida in claim 4 is applicable to claim 7.

As in Claim 8, Zehner et al. discloses *display device* (Fig 1 item 26) as discussed above, but fails to disclose *the shaking pulse has an opposite polarity to the subsequent data pulse when a single shaking pulse is applied*. Zehnrer et al. fails to disclose the above limitation. However, Machida et al. (See Fig 9) discloses a series of shaking pulses (initializing drive, +-300v) that has opposite polarity of subsequent data pulse. Machida et al. discloses the use of shaking pulses to solve the problem of particles being adhere to one side of the capsule. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention to modify the display device of Zehner et al. by apply shaking pulses that is opposite in polarity as to effectively release or loosen the particles from their current position so that they can be addressed to appropriate optical state. The same reason is used to combine Zehnrer and Machida in claim 4 is applicable to claim 8.

As in Claim 9, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose *the length of the or each shaking pulse is of an order of magnitude shorter than the minimum time period of a drive signal required to drive the*

optical state of a picture element from one extreme optical state to the other. However, Machida et al. (See Fig 9 item initializing pulse and Displaying white/black) discloses a series of shaking pulses (initializing drive), where one of this (single) pulse has shorter time period than that of the drive signal (Displaying white/black) that is applied to picture element in order to change optical state from one extreme state to another. The use of shaking pulses in electrophoretic display is well known in the art to solve the problem of particles being adhere to one side of the capsule. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply shaking pulses as disclosed by Machida et al. to effectively release or loosen the particles from their current position so that they can be addressed by driving a pulse to the appropriate optical state to enhance the display quality.

As in Claim 10, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose *the energy value of the or each shaking pulse is insufficient to significantly change the optical state of a picture element*. However, Machida et al. (See Fig 9 and Paragraph 25) discloses a series of shaking pulses (initializing drive) that are used only to dissociate charged particles from adhesion to the substrates or adjacent particles so that it would be easy for drive pulse to move this particles from one optical state to another. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that shaking pulses are used to effectively release or loosen the particles from coagulation and not change optical state.

As in Claim 11, Zehnrer et al. disclose *a display device* (Fig 1 item 26) *as discussed above, but* fails to disclose *the time interval between the one or more shaking pulses and said voltage pulse is substantially zero.* However, Machida et al. (See Fig 9) discloses a series of shaking pulses (initializing drive) having a voltage of (+300 and -300) between the shaking pulses and driving portion will add up to be equal to zero. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Zehner et al. by applying the shaking pulses as disclosed by Machida et al. because Machida et al. suggests the shaking pulses and driving portion as described in fig 9 will add up to be equal to zero.

Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent No US PG Pub No. 2002/0005832 discloses electrophoretic display, resetting period and writing period, an image data is supplied to a data line drive circuit and a gradation voltage is applied to each pixel electrode. Webber (US PG Pub No. 2002/0180687) discloses electrophoretic display comprises a plurality of particles suspended in a suspending fluid.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENYAM KETEMA whose telephone number is

(571)270-7224. The examiner can normally be reached on Monday- Friday 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shalwala Bipin H can be reached on 571-272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Benyam Ketema /

Examiner, Art Unit 2629

/Bipin Shalwala/

Supervisory Patent Examiner, Art Unit 2629